United States Department of Agriculture | Forest Service | Northeastern Area State & Private Forestry | 180 Canfield Street Morgantown, WV 26505-3101

File Code: 3400
Date: January 11, 2006

Mr. Tom Gentile
Earle Naval Weapons Station
Environmental Department
Building C-23
Colts Neck, NJ 07722

Dear Tom:

On December 13 and 14, 2005, USDA Forest Service personnel conducted a gypsy moth egg mass survey at Earle Naval Weapons Station. The purpose of this survey was to determine gypsy moth population densities and to assess the potential for defoliation.

Gypsy moth survey plots were randomly selected based upon available host trees (oak species), size of sample area and uniformity between egg mass counts. At each sample point, a 1/40th acre fixed radius plot was established. The plots consisted of a tally of all the new (2005) egg masses observed on the overstory trees, understory vegetation, ground litter and duff. The total number of egg masses observed for each plot was multiplied by 40 to determine the number of egg masses per acre. Egg mass lengths were also measured at the plots to determine the overall "health" of the existing population and as a measure of egg mass fecundity.

The location of the survey plots are shown in Figure 1. The summarized results of the survey are presented in Table 1. In brief, egg mass densities at Earle Naval Weapons Station ranged from 0-28,120 and averaged 1,886 egg masses per acre. Overall egg mass length tended to be moderate to large in size, ranging from 16-54 mm and averaging 32 mm. Egg masses larger than 25 mm typically indicate healthy populations. Egg mass densities were the highest in the central portion of the site as they ranged from 400-28,120 and averaged 6,557 egg masses per acre. Egg mass lengths in this area were slightly smaller as they averaged 30 mm in length.

The survey results indicate that widespread heavy defoliation (61-100 percent) is likely to occur in the central portion of Earle Naval Weapons Station in 2006 (Figure 2).

This defoliation prediction is further supported when egg density is also used as a means of estimating gypsy moth population densities. Moore and Jones (1987) found that estimating the mean fecundity would increase the precision of gypsy moth density estimates and that a linear relationship exists between egg mass length and fecundity. Further work by Liebhold et al., (1993) demonstrates that the product of the mean egg mass length (mm) and egg mass density provides a more precise means of estimating population densities and predicting defoliation. Using Liebhold's model, Figure 3 shows how this information can be used to correlate the predicted defoliation of an area. Accordingly, the estimated egg mass density of 6,557 masses

per acre (average egg mass density in the central portion of Earle NWS) x 30 mm (average egg mass length) translates to a projected defoliation level of about 86 percent (heavy defoliation). Because egg mass densities and host type are not evenly distributed, actual defoliation will vary from tree to tree but will be predominately heavy throughout this area. Very little, if any, defoliation is likely elsewhere at Earle Naval Weapons Station in 2006.

Please call me at 304-285-1555 if you have any questions regarding this egg mass survey or this letter.

Sincerely,

Rodney L Whiteman

RODENY L WHITEMAN
Forester
Forest Health Protection

Cc: Joe Zoltowski, NJDA
George Koeck, NJDF
Noel Schneeberger, AO

Table 1 – Gypsy moth egg mass survey results at Earle Naval Weapons Station, December 13 and 14, 2005.

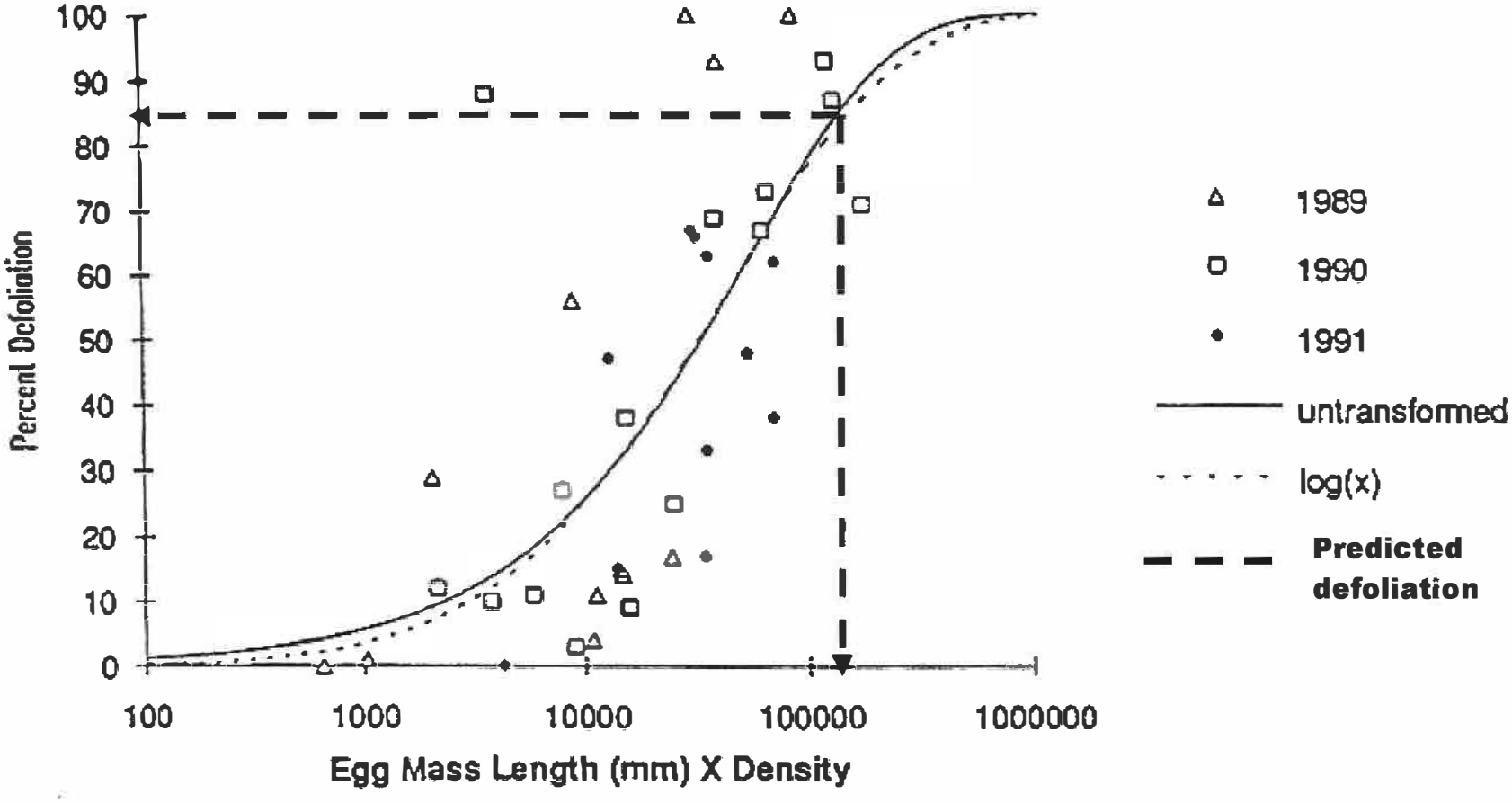
Plot number	Number em/acre
1	40
2	0
3	40
4	160
5	480
6	0
7	160
8	400
9	280
10	0
11	80
12	40
13	440
14	40
15	240
16	1,880
17	640
18	0
19	0
20	0
21	0
22	0
23	0
24	200

Plot number	Number em/acre
25	800
26	0
27	0
28	0
29	0
30	0
31	160
32	12,960
33	19,640
34	28,120
35	3,520
36	520
37	0
38	5,000
39	7,080
40	400
41	0
42	1,360
43	0
44	1,440
45	40
46	1,520
47	1,680

em/acre range = 0-28,120
em/acre average =1,886

Em size range (mm) = 16-54
Em size average (mm) = 32

Figure 3.—Predicted defoliation in the central portion of Earle Naval Weapons Station in 2006.



Scatter plot of the product of mean egg mass length and egg mass density versus mean defoliation. Extracted from Liebhold et al. (1993).

Figure 1. -- Gypsy moth survey plot locations at Earle Naval Weapons Station, December 13 and 14, 2005.

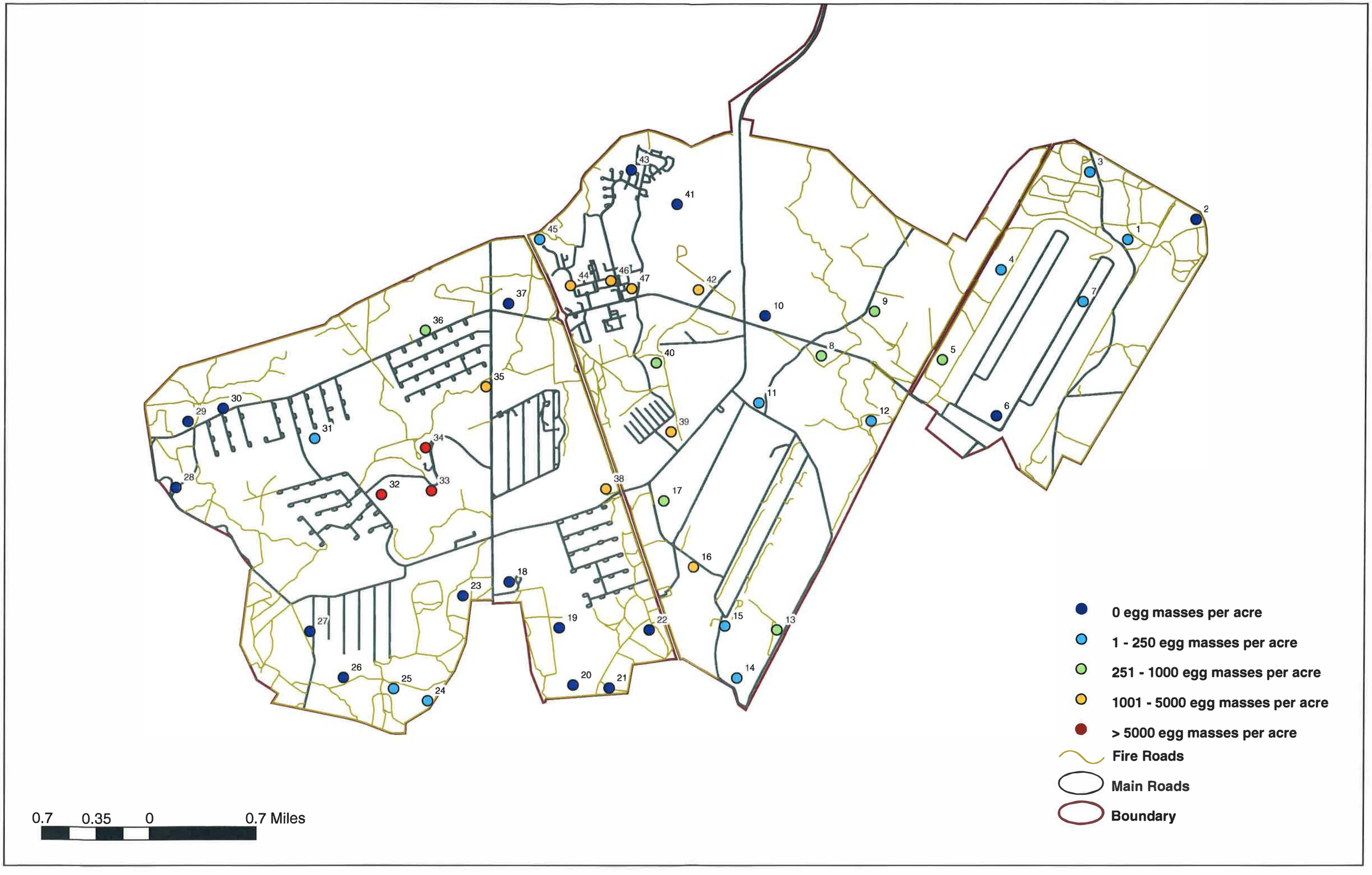

0.7 0.35 0 0.7 Miles
0 egg masses per acre
1 - 250 egg masses per acre
251 - 1000 egg masses per acre
1001 - 5000 egg masses per acre
> 5000 egg masses per acre
Fire Roads
Main Roads
Boundary

Figure 2. -- Area where heavy gypsy moth defoliation is likely to occur at Earle Naval Weapons Station in 2006.